

CLAIMS

I claim:

1. A method of authenticating documents comprising the steps of:
2 illuminating a document with ultraviolet light;
detecting ultraviolet light reflected by said document; and
4 determining the authenticity of said document based upon a comparison of the
ultraviolet light reflected from said bill with the ultraviolet light reflected from a
6 genuine document illuminated with ultraviolet light.
2. The method of claim 1 wherein said detecting step comprises the step of
2 detecting the presence or absence of ultraviolet light reflected from one or more areas
of said document.
3. The method of claim 1 wherein said detecting step comprises the step of
2 detecting a pattern of ultraviolet light reflected by said document.
- 6 4. The method of claim 1 wherein said detecting step comprises the step of
2 detecting the amount of ultraviolet light reflected from one or more areas of said
document.
- 7 5. The method of claim 4 wherein the authenticity of said document is
2 determined relative to genuine currency.

6. The method of claim 5 wherein the authenticity of said document is determined relative to genuine United States currency and wherein a negative determination of authenticity is made regarding said document if a relatively high amount of ultraviolet light is not reflected from said document.

7. The method of claim 1 wherein said detecting step further comprises the step of filtering light to be detected through an ultraviolet filter.

8. The method of claim 1 wherein said detecting step further comprises the step of filtering out light having a wavelength longer than 400 nm.

9. The method of claim 8 wherein said filtering step comprises the step of filtering out light having a wavelength shorter than about 260 nm and light having a wavelength longer than about 380 nm.

10. The method of claim 1 wherein said detecting step is performed by a detector which is not sensitive to light having a wavelength longer than 400 nm.

11. The method of claim 1 further comprising the step of detecting visible light emitted from said document and wherein said step of determining the authenticity of said document is additionally based upon a comparison of the visible light emitted from said document with the visible light emitted from a genuine document illuminated with ultraviolet light.

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12. The method of claim ¹⁵11 wherein said ultraviolet light detecting step comprises
2 the step of detecting the amount of ultraviolet light reflected from one or more areas
of said document and said visible light detecting step comprises the step of detecting
4 the amount of visible light emitted from one or more areas of said document.

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13. The method of claim ¹⁶12 wherein the authenticity of said document is
2 determined relative to genuine currency.

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14. The method of claim ¹⁷13 wherein the authenticity of said document is
2 determined relative to genuine United States currency and wherein a positive
determination of authenticity is made regarding said document only if a relatively
4 high amount of ultraviolet light is reflected from said document and virtually no
amount of visible light is emitted from said document.

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15. The method of claim ¹⁹11 wherein said ultraviolet light detecting step further
2 comprises the step of filtering said light to be detected through an ultraviolet filter.

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16. The method of claim ²²15 wherein said visible light detecting step further
2 comprises the step of filtering said light to be detected through a blue filter.

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17. The method of claim ²³16 wherein said blue filter comprises a blue component
2 filter and a yellow component filter.

18. The method of claim 11 wherein said ultraviolet light detecting step further
 2 comprises the step of filtering out light having a wavelength longer than 400 nm.

19. The method of claim 18 wherein said visible light detecting step further
 2 comprises the step of filtering out light having a wavelength shorter than 400 nm.

20. The method of claim 19 wherein said ultraviolet filtering step comprises the
 2 step of filtering out light having a wavelength shorter than about 260 nm and light
 having a wavelength longer than about 380 nm and wherein said visible light
 4 detecting step further comprises the step of filtering out light having a wavelength
 shorter than about 415 nm and light having a wavelength longer than about 620 nm.

21. The method of claim 11 wherein said ultraviolet light detecting step is
 2 performed by a detector which is not sensitive to light having a wavelength longer
 than 400 nm and wherein said visible light detecting step is performed by a detector
 4 which is not sensitive to light having a wavelength shorter than 400 nm.

22. A device for authenticating documents comprising:
 2 an ultraviolet light source for illuminating a document to be tested;
 an ultraviolet light detector for generating an output signal responsive to
 4 ultraviolet light reflected by said document; and
 a signal processor for receiving said ultraviolet detector output signal and
 6 determining the authenticity of said document based upon said output signal.

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~~30~~ 23. The device of claim ~~22~~²⁹ wherein said output signal is responsive to the
 2 presence or absence of ultraviolet light reflected from one or more areas of said
 document.

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~~33~~ 24. The device of claim ~~22~~²⁹ wherein said detector detects a pattern of ultraviolet
 2 light reflected by said document.

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~~34~~ 25. The device of claim ~~22~~²⁹ wherein said output signal is responsive to the amount
 2 of ultraviolet light reflected from one or more areas of said document.

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~~37~~ 26. The device of claim ~~25~~²⁹ wherein the authenticity of said document is
 2 determined relative to genuine currency.

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~~39~~ 27. The device of claim ~~26~~²⁹ wherein the authenticity of said document is
 2 determined relative to genuine United States currency and wherein a negative
 determination of authenticity is made regarding said document if a relatively high
 4 amount of ultraviolet light is not reflected from said document.

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~~39~~ 28. The device of claim ~~22~~²⁹ wherein said ultraviolet light detector comprises a
 2 photodetector and an ultraviolet filter wherein light from said bill passes through said
 ultraviolet filter before striking said photodetector.

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~~40~~ 29. The device of claim ~~22~~²⁹ wherein said ultraviolet light detector comprises a
 2 photodetector and a first filter wherein light from said bill passes through said first

filter before striking said photodetector; said first filter filtering out light having a
 4 wavelength longer than 400 nm.

⁴¹₃₀. The device of claim ⁴⁰₂₉ wherein said first filter filters out light having a
 2 wavelength shorter than about 260 nm and light having a wavelength longer than
 about 380 nm.

⁴²₃₁. The device of claim ⁴⁰₂₉ wherein said filter has a peak transmittance
 2 wavelength of about 360 nm.

⁴³₃₂. The device of claim ²⁹₂₂ wherein said detector is not sensitive to light having a
 2 wavelength longer than 400 nm.

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 33. The device of claim 22 further comprising a visible light detector for
 generating an output signal responsive to visible light emitted by said document upon
 illumination of said document by said ultraviolet light source and wherein said signal
 4 processor receives said visible detector output signal and determines the authenticity
 of said document based additionally upon said visible detector output signal.

⁴⁵₃₄. The device of claim ⁴⁴₃₃ wherein said ultraviolet light detector output signal is
 2 responsive to the amount of ultraviolet light reflected from one or more areas of said
 document and said visible light detector output signal is responsive to the amount of
 4 visible light emitted from one or more areas of said document.

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35. The device of claim 34 wherein the authenticity of said document is
2 determined relative to genuine currency.

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36. The device of claim 35 wherein the authenticity of said document is
2 determined relative to genuine United States currency and wherein a positive
determination of authenticity is made regarding said document only if a relatively
4 high amount of ultraviolet light is reflected from said document and virtually no
amount of visible light is emitted from said document.

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37. The device of claim 35 wherein the authenticity of said document is
2 determined relative to genuine United States currency and wherein a negative
determination of authenticity is made regarding said bill if either (1) less than a first
4 predetermined amount of reflected ultraviolet light is detected from said bill or (2)
more than a second predetermined amount of visible light is detected from said bill.

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38. The device of claim 37 wherein said first predetermined amount is a relatively
2 high amount and wherein said second predetermined amount is a very low amount.

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39. The device of claim 37 wherein said first predetermined amount is set equal to
2 approximately one-half the amount expected from genuine United States currency.

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40. The device of claim 33 wherein said ultraviolet light detector comprises a first
2 photodetector and an ultraviolet filter wherein light from said bill passes through said
ultraviolet filter before striking said first photodetector.

⁵²41. The device of claim ⁵¹40 wherein said visible light detector comprises a second
 2 photodetector and a blue filter wherein light from said bill passes through said blue
 filter before striking said second photodetector.

⁵³42. The device of claim ⁵²41 wherein said blue filter is a single blue filter; said
 2 single blue filter filtering out light having a wavelength shorter than about 415 nm
 and light having a wavelength longer than about 620 nm; said single blue filter
 4 having a peak transmittance wavelength of about 450 nm.

⁵⁴43. The device of claim ⁵²41 wherein said blue filter comprises a blue component
 2 filter and a yellow component filter.

⁵⁴44. The device of claim ⁴⁴33 wherein said ultraviolet light detector comprises a first
 2 photodetector and a first filter wherein light from said bill passes through said first
 filter before striking said first photodetector; said first filter filtering out light having
 4 a wavelength longer than 400 nm.

⁵⁶45. The device of claim ⁵⁵44 wherein said visible light detector comprises a second
 2 photodetector and a second filter wherein light from said bill passes through said
 second filter before striking said second photodetector; said second filter filtering out
 4 light having a wavelength shorter than 400 nm.

⁵⁷46. The device of claim ⁵⁶45 wherein said first filter filters out light having a
 2 wavelength shorter than about 260 nm and light having a wavelength longer than

about 380 nm and wherein said second filter filters out light having a wavelength
 4 shorter than about 415 nm and light having a wavelength longer than about 620 nm.

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~~47~~. The device of claim ⁵⁶~~45~~ wherein said first filter has a peak transmittance
 2 wavelength of about 360 nm.

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~~48~~. The device of claim ⁴⁴~~33~~ wherein said ultraviolet light detector is not sensitive
 2 to light having a wavelength longer than 400 nm.

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~~49~~. The device of claim ⁴⁴~~33~~ wherein said visible light detector is not sensitive to
 2 light having a wavelength shorter than 400 nm.

⁶¹
~~50~~. A system for authenticating documents comprising:
 2 an ultraviolet light source for illuminating a document to be tested;
 a reflected ultraviolet light testing apparatus comprising
 4 an ultraviolet light detector for generating an output signal responsive
 to ultraviolet light reflected by said document; and
 6 a signal processor for receiving said ultraviolet detector output signal
 and determining the authenticity of said document based upon
 8 said output signal; and
 means for selectively activating said reflected ultraviolet light testing
 10 apparatus.

51. The system of claim ~~50~~ further comprising:

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2 a visible light testing apparatus comprising
a visible light detector for generating an output signal responsive to
4 visible light emitted by said document in response to said
document being illuminated with ultraviolet light; and
6 a signal processor for receiving said visible light detector output signal
and determining the authenticity of said document based upon
8 said visible light detector output signal; and
means for selectively activating said visible light testing apparatus.

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